From:	"France-Isetts, Pauletta" </O=EXCHANGELABS/OU=EXCHANGE;ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=EFA97B4E466343548298CAF16C843A25-FRANCE-ISSETS,PAULETTA>
To:	Harris
	Diane <E.;>
CC:	Drake
	"Dave;Jeff Pritchard" <jpritchard@seagullenvirotech.com>
Date:	2/13/2014 10:19:09 AM
Subject:	Request for QAPP review -- Missouri Electric Works FiveYear Review sampling
Attachments:	MEW 5 Yr Review QAPP.pdf

Diane –

Attached is a pdf copy of the QAPP/SAP submitted by Seagull for upcoming sampling at the Missouri Electric Works Site. I am requesting review of the document by the QA Office. Please provide comments, concerns and/or approval to me. We would like to be in the field sampling sometime in March.

Time for document review should be charged to: 076RFE00

Thanks

--Pauletta

Seagull Environmental Technologies, Inc.

121 NE 72nd Street
Gladstone, Missouri 64118
www.seagullenvirotech.com

January 29, 2014

Ms. Pauletta France-Isetts
EPA Remedial Project Manager
U.S. Environmental Protection Agency, Region 7
11201 Renner Boulevard
Lenexa, Kansas 66219

Subject: **Quality Assurance Project Plan for 5-Year Review Sampling at the Missouri Electric Works Site, Cape Girardeau, Missouri**
EPA Region 7, Mini-START Contract No. EP-S7-12-04, Task Order No. 0016
Task Monitor: Pauletta France-Isetts, EPA Remedial Project Manager

Dear Ms. France-Isetts:

Seagull Environmental Technologies, Inc., is submitting the attached Quality Assurance Project Plan for 5-Year Review Sampling at the Missouri Electric Works site in Cape Girardeau, Missouri. If you have any questions or comments, please contact the Project Manager at (913) 220-5887.

Sincerely,

Jeff Pritchard, CHMM
Mini-START Project Manager

Hieu Q. Vu, PE
Mini-START Program Manager

Enclosures

cc: Roy Crossland, Mini-START Project Officer (cover letter only)

QUALITY ASSURANCE PROJECT PLAN
FOR 5-YEAR REVIEW SAMPLING

MISSOURI ELECTRIC WORKS SITE, CAPE GIRARDEAU, MISSOURI
CERCLIS ID: MOD980965982

Mini-Superfund Technical Assessment and Response Team (Mini-START)

Contract No. EP-S7-12-04, Task Order No. 0016

Prepared For:

U.S. Environmental Protection Agency
Region 7
Superfund Division
11201 Renner Boulevard
Lenexa, Kansas 66219

January 29, 2014

Prepared By:

Seagull Environmental Technologies, Inc.
121 NE 72nd Street
Gladstone, Missouri 64118

CONTENTS

APPENDICES

Region 7 Superfund Program
Addendum to the Generic QAPP for Superfund Site Assessment and Targeted Brownfields Assessment Programs (October 2012)
for the Missouri Electric Works Site

Project Information:

Project Name: Missouri Electric Works		**City:** Cape Girardeau	**State:** MO
EPA Project Manager: Pauletta France-Isetts		**Project Manager:** Jeff Pritchard	
Approved By:		**Prepared For:** EPA Region 7 Superfund Division	
Title: Mini-START Project Manager	Date:		
Approved By:			
Title: Mini-START Program Manager	Date:		
Approved By:		**Prepared By:** Jeff Pritchard	
Title: Mini-START QA Manager	Date:	**Date:** January 29, 2014	
Approved By:			
Title: EPA Project Manager	Date:		
Approved By:		**Project Number:** EPS71204.0016	
Title: EPA Region 7 QA Manager	Date:		

1.0 Project Management:

1.1 Distribution List

EPA—Region 7: Pauletta France-Isetts, Remedial Project Manager/Project Contact
Diane Harris, QA Manager

Mini-START: Jeff Pritchard, Project Manager

1.2 Project/Task Organization

Pauletta France-Isetts, of the EPA Region 7 Superfund Division, will serve as the EPA project contact for the activities described in this QAPP. Jeff Pritchard, with Seagull Environmental Technologies, Inc., will serve as the Mini-START Project Manager for field activities.

1.3 Problem Definition/Background:

Description: This site-specific Quality Assurance Project Plan form is prepared as an addendum to the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012), and contains site-specific data quality objectives for the sampling activities described herein.

☒ Description attached.
☐ Description in referenced report: _____ _____
Title Date

1.4 Project/Task Description:

☐ CERCLA PA ☐ CERCLA SI ☐ Brownfields Assessment ☐ Removal Action
☒ Other (description attached): ☐ Pre-CERCLIS Screening ☐ Removal Site Evaluation

Other Description: 5-Year Review sampling

Schedule: Field work is scheduled to begin in early February 2014 and is anticipated to take up to 5 days to complete.

☐ Description in referenced report: _____ _____
Title Date

1.5 Quality Objectives and Criteria for Measurement Data:

a. Accuracy:	☒ Identified in attached table.
b. Precision:	☒ Identified in attached table.
c. Representativeness:	☒ Identified in attached table.
d. Completeness*:	☒ Identified in attached table.
e. Comparability:	☒ Identified in attached table.

Other Description:

*A completeness goal of 100 percent has been established for this project. However, if the completeness goal is not met, EPA may still be able to make decisions based on any or all of the remaining validated data. No "critical samples" have been identified for this project.

1.6 Specific Training/Certification Requirements:

☒ OSHA 1910 ☒ Special Equipment/Instrument Operator (describe below): ☐ Other (describe below):

Sampling personnel will be experienced in Geoprobe® operation and in the collection of soil samples using Geoprobe® equipment. Geoprobe® operation will be conducted by a licensed Missouri Well Driller.

Region 7 Superfund Program
Addendum to the Generic QAPP for Superfund Site Assessment and Targeted Brownfields Assessment Programs (October 2012)
for the Missouri Electric Works Site

1.7 Documentation and Records:

☒ Field Sheets ☒ Daily Log ☒ Trip Report ☒ Area Maps ☐ Video
☒ Chain of Custody ☒ Health and Safety Plan ☐ Letter Report ☒ Photos

☒ Sample documentation will follow EPA Region 7 SOP 2420.05.
☒ Other: Analytical information will be handled according to procedures identified in Table 2.

2.0 Measurement and Data Acquisition:

2.1 Sampling Process Design:

☐ Random Sampling ☐ Transect Sampling ☒ Biased/Judgmental Sampling ☐ Stratified Random Sampling
☐ Search Sampling ☐ Systematic Grid ☐ Systematic Random Sampling ☒ Definitive Sampling
☐ Screening w/o Definitive Confirmation ☐ Screening w/ Definitive Confirmation
☒ Sample Map Attached

☒ Other (Provide rationale behind each sample): See Appendix A for additional sampling information.

The proposed sampling scheme will be judgmental with definitive laboratory analysis for soil, groundwater, and fish tissue samples, in accordance with the *Guidance for Performing Site Inspections Under CERCLA*, OSWER Directive #9345.1-05, September 1992, and *Removal Program Representative Sampling Guidance, Volume 1: Soil*, OSWER Directive 9360.4-10, November 1991. Judgmental sampling is the subjective (based) selection of sampling locations based on historical information, visual inspection, and the best professional judgment of the sampler(s). See Appendices A and B for additional site-specific information and figures.

Sample Summary Location	Matrix	# of Samples*	Analysis
Upland Area (Former MEW Operations Site), Ravine Area, Wilson Road Drainage Ditch, and Lowland Area	Soil	84	PCBs
Monitoring Wells (WSW-1, MW-3, MW-5, MW-11, and MW-12)	Groundwater	5	PCBs (total and dissolved) and VOCs
Monitoring Wells (MWs-16A/B/C)	Groundwater	3	PCBs (total and dissolved) and Chlorobenzenes
Lowland Area Pond	Fish Tissue	2	PCBs

*NOTE: Number is approximate and may change depending on site conditions. Background/QC samples are not included with these totals. See Table 1 for a complete sample summary.

2.2 Sample Methods Requirements:

Matrix	Sampling Method	SOP(s) or other Method(s)
Soil	Soil samples will be collected with a Geoprobe® direct-push apparatus, using Macro-Core samplers fitted with polyvinyl chloride (PVC) liners, and transferred to the appropriate sample containers.	SOPs 4230.07 & 4231.2012
Groundwater	Monitoring well samples will be collected after the monitoring wells have been purged using low-flow techniques and field water quality parameters have stabilized.	SOP 4231.2007
Fish Tissue	Fish will be collected using seines or gill nets. The whole fish will be transferred to the appropriate sample containers for delivery to the analytical laboratory.	SOP 2334.13

☐ Other Description:.

2.3 Sample Handling and Custody Requirements:

☒ Samples will be packaged and preserved in accordance with procedures defined in Region 7 EPA SOP 2420.06.
☒ COC will be maintained as directed by Region 7 EPA SOP 2420.04.
☐ Samples will be accepted according to Region 7 EPA SOP 2420.01.
☒ Other (Describe): Samples will be accepted in accordance with procedures established by a Seagull-contracted laboratory.

2.4 Analytical Methods Requirements:

☒ Identified in attached table.
☒ Rationale: The requested analyses have been selected based on historic information about the site and program experience with similar types of sites.
☐ Other (Describe):

2.5 Quality Control Requirements:

☐ Not Applicable
☒ Identified in attached table.
☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012).
☒ Field QC Samples: For this investigation, field QC samples will include one water trip blank, one water field blank, and one equipment rinsate blank. The trip blank will be used to assess transportation-related contamination. The field blank will be collected to evaluate contamination of sampling containers and/or preservatives and to assess contamination potentially introduced during the sampling and laboratory procedure(s). The equipment rinsate blank wil evaluate the effectiveness of decontamination for the groundwater sampling equipment. The blank samples will be submitted for the analyses listed in the attached tables. Evaluation of the blank samples depends on the levels of contamination found in environmental samples to determine whether the environmental samples are representative. Analytical results of the blank samples will be evaluated on a qualitative basis by the EPA Project Manager and EPA contractor(s) to determine a general indication of field-introduced and/or lab-introduced contamination. Because it is not necessary for total method precision to be evaluated for this project, no field duplicates will be collected.
☐ Other (Describe):

2.6 Instrument/Equipment Testing, Inspection, and Maintenance Requirements:

☐ Not Applicable
☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012).
☒ Testing, inspection, and maintenance of field instruments (global positioning system [GPS] unit, etc.) will be performed in accordance with manufacturers' recommendations. Testing, inspection, and maintenance of laboratory equipment will be performed in accordance with the previously referenced SOPs and/or manufacturers' recommendations.

2.7 Instrument Calibration and Frequency:

☐ Not Applicable
☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012).
☒ Calibration of laboratory equipment will be performed as described in the previously referenced SOPs and/or manufacturers' recommendations.
☒ Other (Describe): Calibration of field equipment will be performed as described in the previously referenced SOPs and/or manufacturers' recommendations.

2.8 Inspection/Acceptance Requirements for Supplies and Consumables:

☐ Not Applicable
☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012).
☒ All sample containers will meet EPA criteria for cleaning procedures for low-level chemical analysis. Sample containers will have Level II certifications provided by the manufacturer in accordance with pre-cleaning criteria established by EPA in *Specifications and Guidelines for Obtaining Contaminant-Free Containers.*
☐ Other (Describe):

2.9 Data Acquisition Requirements:

☐ Not Applicable
☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012).
☒ Previous data or information pertaining to the area (including other analytical data, reports, photos, maps, etc. that are referenced in this QAPP) has been compiled by EPA and/or its contractor(s) from other sources. Some of that data have not been verified by EPA and/or its contractor(s); however, the information will not be used for decision-making purposes by EPA without verification by an independent professional qualified to verify such data information.
☐ Other (Describe):

2.10 Data Management:

☐ All laboratory data acquired will be managed in accordance with Region 7 EPA SOP 2410.01.
☒ Other (Describe): Laboratory data will be managed in accordance with procedures established by the Seagull-contracted laboratory.

3.0 Assessment and Oversight:

3.1 Assessment and Response Actions:

☒ Peer Review ☒ Management Review ☐ Field Audit ☐ Lab Audit
☐ Assessment and response actions pertaining to analytical phases of the project are addressed in Region 7 EPA SOPs 2430.06 and 2430.12.
☒ Other (Describe): Assessment and response actions pertaining to analytical phases of the project will be in accordance with procedures established by the Seagull-contracted laboratory.

3.1A Corrective Action:

☒ Corrective actions will be at the discretion of the EPA Project Manager whenever problems appear that could adversely affect data quality and/or resulting decisions affecting future response actions pertaining to the area.
☐ Other (Describe):

3.2 Reports to Management:

☐ Audit Report ☒ Data Validation Report ☐ Project Status Report ☐ None Required

☐ A letter report describing the sampling techniques, locations, problems encountered (with resolutions to those problems), and interpretation of analytical results will be prepared and submitted to the EPA.
☒ Reports will be prepared in accordance with the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012).
☐ Other (Describe):

4.0 Data Validation and Usability:

4.1 Data Review, Validation, and Verification Requirements:

☐ Identified in attached table.
☒ Data review and verification will be performed in accordance with the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012).
☐ Data review and verification will be performed by a qualified analyst and the laboratory's section manager as described in Region 7 EPA SOPs 2430.06, 2430.12, and 2410.10.
☒ Other (Describe): The analytical data package will be validated internally by the contracted laboratory in accordance with the laboratory's established SOPs. A Seagull chemist will conduct an external verification and validation of the laboratory data package using a method consistent with a Stage 2B validation, as described in the EPA Contract Laboratory Program (CLP) Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (EPA 2009). A Stage 2B validation includes verification and validation based on completeness and compliance check of sample receipt conditions and sample-related and instrument-related QC results. The EPA Project Manager will be responsible for overall validation and final approval of the data, in accordance with the projected use of the results.

4.2 Validation and Verification Methods:

☐ Identified in attached table.
☐ The data will be validated in accordance with Region 7 EPA SOPs 2430.06, 2430.12, and 2410.10.
☒ The EPA Project Manager will inspect the data to provide a final review. The EPA Project Manager will review the data, if applicable, for laboratory spikes and duplicates, laboratory blanks, and field QC samples to ensure the data are acceptable. The EPA Project Manager will also compare the sample descriptions with the field sheets for consistency, and will ensure appropriate documentation of any anomalies in the data.
☒ Other (Describe): If any problems with field measurements or analytical data are identified by Seagull's data verification/validation, the Seagull Project Manager will verbally, and in writing if requested by EPA, explain with circumstances of the failure, describe any corrective action taken, and provide an opinion on the limitations and usefulness of the data to the EPA Project Manager.

4.3 Reconciliation with User Requirements:

☒ If data quality indicators do not meet the project's requirements as outlined in this QAPP, the data may be discarded and re-sampling or re-analysis of the subject samples may be required by the EPA Project Manager.
☐ Other (Describe):

Region 7 Superfund Program
Addendum to the Generic QAPP for Superfund Site Assessment and Targeted Brownfields Assessment Programs (October 2012)
for the Missouri Electric Works Site

Table 1: Sample Summary

Project Name: Missouri Electric Works Site	**Location:** Cape Girardeau, Missouri; See Appendix B, Figures 1 and 2	
Project Manager: Jeff Pritchard	**Activity/ASR #:** NA	**Date:** January 29, 2014

No. of Samples	Matrix	Location	Purpose	Depth or other Descriptor	Requested Analysis	Sampling Methods	Analytical Method
84	Soil	Upland Area (Former MEW Operations site), Ravine Area, Wilson Road Drainage Ditch, and Lowland Area	To assess soil contamination from historical site operations	Sample depth are dependent upon sampling location. Sample depths include 0 to 2 inches, 6 inches, 1 foot, and 5 feet below ground surface	PCBs	EPA SOPs 4230.07 & 4231.2012	EPA Method 8082
5	Groundwater	Monitoring wells (WSW-1, MW-3, MW-5, MW-11, and MW-12)	To assess groundwater contamination from historical site operations	Screened interval	PCBs (total and dissolved) and VOCs	EPA SOP 4231.2007	EPA Methods 8082 and 8260
3	Groundwater	Monitoring wells (MWs-16/A/B/C)	To assess groundwater contamination from historical site operations	Screened interval	PCBs (total and dissolved) and Chlorobenzenes	EPA SOP 4231.2007	EPA Methods 8082 and 8260
2	Fish Tissue	Lowland Area pond	To assess impacts to fish in the pond as a result of historical site operations	Whole fish	PCBs	EPA SOP 2334.13	EPA Method 8082
QC Samples							
1	Water	Trip blank	To assess transportation-related contamination	NA	VOCs	NA	EPA Method 8260
1	Water	Field blank	To assess field/laboratory-related contamination	NA	PCBs (total only) and VOCs (including chlorobenzenes)	NA	EPA Methods 8082 and 8260
1	Water	Equipment rinsate blank	To evaluate effectiveness of decontamination procedures for groundwater sampling equipment	NA	PCBs (total and dissolved) and VOCs (including chlorobenzenes)	NA	EPA Methods 8082 and 8260

Region 7 Superfund Program
Addendum to the Generic QAPP for Superfund Site Assessment and Targeted Brownfields Assessment Programs (October 2012)
for the Missouri Electric Works Site

Table 2: Data Quality Objective Summary

Project Name: Missouri Electric Works Site	**Location:** Cape Girardeau, Missouri; See Appendix B, Figures 1 and 2	
Project Manager: Jeff Pritchard	**Activity/ASR #:** NA	**Date:** January 29, 2014

Analysis	Analytical Method	Data Quality Measurements					Sample Handling Procedures	Data Management Procedures
		Accuracy	Precision	Representativeness	Completeness	Comparability		
SOIL								
PCBs	See Table 1	Per analytical method	Per analytical method	Biased/judgmental sampling, based on professional judgment of the sampling team	100%; no critical samples have been defined	Standardized procedures for sample collection and analysis will be used.	See Section 2.3 of QAPP form.	See Section 2.10 of QAPP form.
GROUNDWATER								
PCBs, VOCs, and Chlorobenzenes	See Table 1	Per analytical method	Per analytical method	Biased/judgmental sampling, based on professional judgment of the sampling team	100%; no critical samples have been defined	Standardized procedures for sample collection and analysis will be used.	See Section 2.3 of QAPP form.	See Section 2.10 of QAPP form.
FISH TISSUE								
PCBs	See Table 1	Per analytical method	Per analytical method	Biased/judgmental sampling, based on professional judgment of the sampling team	100%; no critical samples have been defined	Standardized procedures for sample collection and analysis will be used.	See Section 2.3 of QAPP form.	See Section 2.10 of QAPP form.

APPENDIX A

SITE-SPECIFIC INFORMATION FOR THE MISSOURI ELECTRIC WORKS SITE

INTRODUCTION

Seagull Environmental Technologies, Inc. (Seagull) has been tasked by the U.S. Environmental Protection Agency (EPA), under the Mini-Superfund Technical Assessment and Response Team (Mini-START) contract, to conduct sampling activities as part of the 5-year review for the Missouri Electric Works (MEW) site. The purpose of the sampling activity is to collect data for ongoing site evaluation as part of the remedial process. This Quality Assurance Project Plan (QAPP) identifies site-specific features and addresses elements of the sampling strategy and analytical methods proposed for this investigation.

SITE DESCRIPTION/BACKGROUND

MEW, Inc., operated at 824 South Kingshighway in Cape Girardeau, Cape Giradeau County, Missouri (see Appendix B, Figure 1). MEW, Inc., acquired the facility property (approximately 6.5 acres) in 1952 and serviced, repaired, reconditioned, and salvaged electrical equipment from 1954 to 1992. Electrical equipment processed during this period consisted of oil-filled electrical transformers, electric motors, electric equipment controls, and oil-filled switches. According to business records obtained from MEW, Inc., more than 16,000 transformers were repaired or scrapped. Approximately 90 percent of the transformer oil that was salvaged from the equipment was filtered and reused (EPA 2011). The total amount of transformer oil that was not recycled was estimated to be approximately 28,000 gallons. Information gathered during interviews of former employees of the facility indicated that the majority of the non-recycled oil had been disposed of on property owned by MEW, Inc. In addition, industrial solvents were used to clean the electrical equipment repaired or serviced by MEW, Inc. These solvents were reused until they were no longer effective. Spills and the disposal of spent solvents onto soils were reported by former employees during EPA-conducted interviews (EPA 2011).

Contamination was first detected at the site in 1984 during a Missouri Department of Natural Resources (MDNR) Toxic Substances Control Act inspection. During this inspection, MDNR discovered polychlorinated biphenyl (PCB)-contaminated soils and inappropriate storage of over 100 55-gallon drums of PCB-containing oil. From 1985 through 1988, EPA conducted additional investigations to characterize the extent of contamination originating from MEW, Inc., operations. EPA investigations determined (1) PCB contamination in surface soil was extensive (PCB concentrations of up to 58,000 parts per million [ppm] were detected), (2) shallow subsurface soils contained low levels of contamination, (3) off-site migration of PCB-contaminated soils had occurred along drainage paths, (4) measureable levels of PCBs were present on walls of MEW, Inc., and nearby buildings, and (5) measurable concentrations of airborne PCBs were present (EPA 2012). The facility was issued an order

in 1988, prohibiting the company from accepting electrical equipment containing oil with PCB levels in excess of 1 ppm (EPA 2011).

The MEW Steering Committee (MEWSC)—a group of former MEW, Inc., customers identified by EPA as potentially responsible parties (PRP)—conducted a Remedial Investigation (RI) pursuant to an Administrative Order on Consent (AOC). This RI, conducted during 1989 and 1990, focused on soil and sediment contamination. A voluntary groundwater investigation conducted by the MEWSC after issuance of the 1990 EPA Record of Decision identified PCB contamination above risk-based levels at depths to 400 feet below ground surface (bgs). MEWSC completed a Groundwater Design Investigation in 2005, when contaminants originating from MEW, Inc., operations were detected at concentrations that exceeded Maximum Contaminant Levels (MCL) in two distinct aquifers. The deeper fractured bedrock aquifer was found to be contaminated with PCBs and volatile organic compounds (VOC), while the alluvial aquifer was found to be contaminated with VOCs only. To address contamination associated with the site, MEW has been divided into three Operable Units (OU): (1) OU1 for soil contamination, (2) OU2 for groundwater contamination, and (3) OU3 for sediment contamination in adjacent wetlands.

SAMPLING STRATEGY AND METHODOLOGY

The sampling activities are tentatively scheduled to be conducted in February or March 2014 and will require approximately 5 days to complete. Anticipation is that three Seagull employees will be required to perform the activities described in this QAPP. When applicable, the standard operating procedures (SOP) and chain-of-custody (COC) procedures referenced in the QAPP will be followed throughout the sampling activities to verify the integrity of the samples from the time of collection until submittal to the laboratory for analysis. Disposal of investigation-derived wastes (IDW) and procedures for equipment and personal decontamination will be addressed in a site-specific health and safety plan prepared by Seagull. Most IDW is expected to consist of disposable sampling supplies (gloves, paper towels, tubing, etc.) that will be disposed of offsite as uncontaminated solid waste. Descriptions of the sampling strategy and procedures are presented below.

Soil Sampling

For the sampling activity, a total of 84 soil samples will be collected from 28 locations. Those 28 sample locations are comprised of eight from the Upland Area, four from the Ravine Area, two from Wilson Road South Drainage Ditch, and 14 from the Lowland Area. Figure 2 in Appendix B shows the sample locations. From each of the eight Upland Area, four Ravine Area, and two Wilson Road South Drainage Ditch locations, samples will be collected from the top 2 inches of soil and at 6 inches bgs. From the 14

Lowland Area locations, samples will be collected from the top 2 inches of soil, and at 6 inches bgs, 1 foot bgs, and 5 feet bgs.

Soil samples will either be collected with stainless steel spoons, a hand auger/spade, or with a Geoprobe® Macro-Core soil sampler. The sample collection method will be dependent on ground cover (soil, concrete, etc.) and the desired sample depth. From sample locations not covered by concrete or asphalt, the samples collected from the top 2 inches of soil will be collected with stainless steel spoons. Samples collected at 6 inches bgs will be collected with a hand auger or spade. Samples collected from locations covered by concrete/asphalt and all samples below 6 inches bgs will be collected with a Geoprobe® Macro-Core soil sampler.

It is anticipated that at most locations, a truck-mounted Geoprobe® will be used to drive a Geoprobe® Macro-Core soil sampler fitted with a disposable polyvinyl chloride (PVC) sleeve to the desired sampling depth, up to 5 feet bgs. However, at locations not accessible by truck, the Geoprobe® Macro-Core soil sampler will be driven using a Geoprobe® slam bar device. The soil cores will be retrieved and screened for VOCs with a photoionization detector (PID). All soil cores will be logged to determine soil characteristics. Samples will be collected from the specific depths discussed above, dependent upon location.

All of the soil samples will be submitted for laboratory analysis of PCBs. Soil samples collected with a stainless steel spoon or hand auger/spade will be placed directly into disposable aluminum pie pans and homogenized prior to transfer to 4-ounce glass jars. Soil samples collected in a Geoprobe® Macro-Core soil sampler will be removed from the PVC sleeves and placed in disposable aluminum pie pans and homogenized prior to transfer to 4-ounce glass jars. Following sample collection, excess soil will be returned to the respective boreholes. Remaining void space in the boreholes will be filled with bentonite. Decontamination of the Geoprobe® samplers and rods will be conducted using a tap water wash and rinse.

Pertinent data, including analyses to be performed and exact sample locations, will be recorded on field sheets for each soil sample. All soil samples will be stored in coolers maintained at or below 4 degrees Celsius (°C) pending submittal to a Seagull-contracted laboratory.

Groundwater Sampling

Eight groundwater samples will be collected from permanent groundwater monitoring wells associated with the site (see Appendix B, Figure 2). Table 1 summarizes the monitoring wells to be sampled. The wells will be sampled using a low-flow, or “micro-purge” technique. This sampling method involves

placement of a pump intake at a specific depth within the screened interval (generally towards the middle or top of the screen) and discharging at a flow rate of 0.1 to 0.5 liter per minute (L/min). If the formation is suitably transmissive to prevent significant drawdown (> 0.1 meter) at these pumping rates, this technique can be used as a means of reducing pre-sampling purge volumes. Generally, no specialized equipment is required other than devices to monitor flow rates and field parameters of the well discharge. The technique can be performed with peristaltic, bladder, or electrical submersible pumps. New polyethylene tubing will be used for each well. As each well is purged, field parameters will be monitored continuously using a water quality instrument. A sample will be collected when all field parameters have stabilized, indicating the purge discharge is representative of aquifer conditions.

TABLE 1

SUMMARY OF MONITORING WELLS

Monitoring Well	Total Depth of Well (feet bgs)	Screened Interval (feet bgs)
WSW-1	150	Not Known
MW-3	60	49-59
MW-5	41	35-40
MW-11	120	115-120
MW-12	68	Open Below 60
MW-16A	19	14-19
MW-16B	79	69-79
MW-16C	141	130-140

Notes:

bgs Below ground surface

All of the monitoring well samples will be submitted for analysis of PCBs (total and dissolved). Samples collected from MW-16A/B/C will also be submitted for analysis of VOCs. Samples collected from WSW-1, MW-3, MW-5, MW-11, and MW-12 will be submitted for analysis of chlorobenzenes (instead of the full suite of VOCs).

Water samples submitted for analysis of PCBs will be collected in 1-liter glass bottles (two each for total and dissolved PCB analysis). Samples for analysis of dissolved PCBs will be filtered in the field. Samples submitted for analysis of VOCs and chlorobenzenes will be collected in four 40-milliliter (mL) vials preserved with hydrochloric acid (HCl) to a pH<2.

A field sheet will be completed for each groundwater sample. The field sheets will include the exact sample locations and analyses to be performed. All water samples will be stored in coolers maintained at or below 4 °C until they are submitted to the Seagull-contracted laboratory.

Fish Tissue Sampling

Two fish tissue samples will be collected during the site activities to evaluate whether site-related contamination has impacted fish. The fish tissue samples are proposed to be collected from two separate fish. Those fish will include one sport fish (e.g., bass) and one bottom feeding fish (e.g., carp, catfish, etc.). The fish will be collected from the pond located in the Lowland Area (see Appendix B, Figure 2).

The fish will be collected by two Seagull personnel using seines. A seine will be worked across portions of the pond in attempts to collect the desired fish. If seining is unsuccessful, then gill nets may be utilized to collect the fish. The whole fish will be submitted for laboratory analysis of PCBs. Upon collection, the fish will be wrapped in aluminum foil and stored in a cooler maintained at or below 4 °C until they are submitted to the Seagull-contracted laboratory. The laboratory will homogenize the fish for analysis upon their receipt.

A field sheet will be completed for each fish tissue sample. The field sheets will include the exact sample locations and analyses to be performed.

QUALITY CONTROL

To evaluate sample quality control (QC), one field blank (water), one trip blank (water), and one equipment rinsate (water) will be collected, as specified in Section 2.5 of the QAPP form. Because it is not necessary for total method precision to be evaluated for this project, no field duplicates will be collected.

ANALYTICAL METHODS

All samples will be submitted to a Seagull-contracted laboratory. Seagull will competitively bid the analytical work from its pool of pre-qualified laboratories. Soil and groundwater samples will be analyzed according to EPA SW-846 Methods for PCBs (Method 8082), VOCs (Method 8260), and chlorobenzenes (Method 8260). Fish tissue samples will be analyzed for PCBs (Method 8082). Standard detection limits and turnaround times for those methods will be adequate for this project. Appropriate containers and physical/chemical preservation techniques will be employed during the field activities to help verify that representative analytical results are obtained. Submittal of samples to the laboratory is expected in February or March 2014.

REFERENCES

U.S. Environmental Protection Agency (EPA).

2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. OSWER No. 9200.1-85, EPA540-R-08-005. January.

2011. Quality Assurance Project Plan for Continued Monitored Natural Attenuation Sampling for Missouri Electric Works; Cape Girardeau, Missouri.

2012. Region 7 Cleanup NPL Files. http://www.epa.gov/region7/cleanup/npl_files/mod980965982.pdf

APPENDIX B

FIGURES

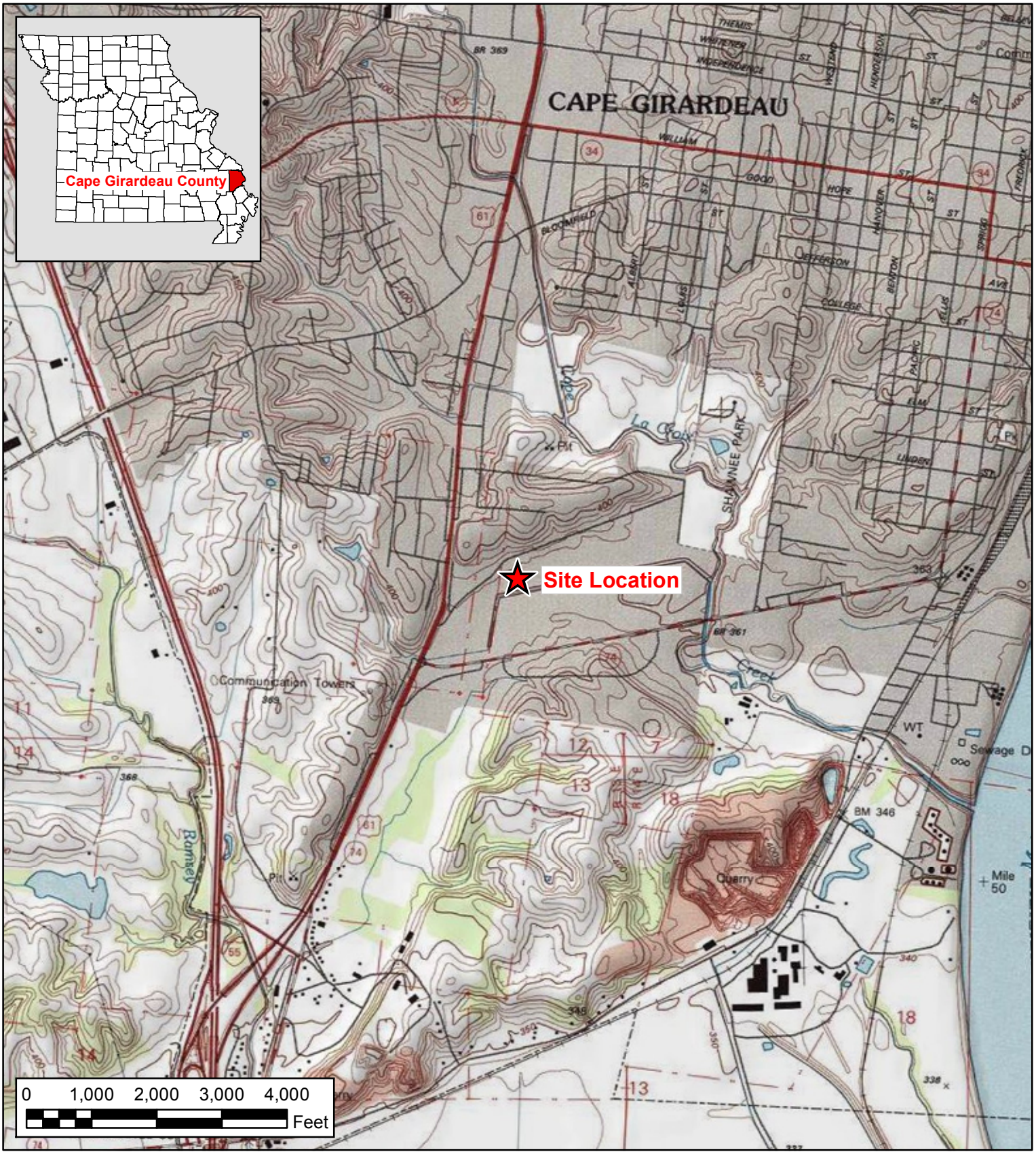

Figure 1
Site Location Map
Missouri Electric Works OU2 Site
Cape Girardeau, Missouri

Seagull Environmental Technologies, Inc.

Source: USGS Cape Girardeau, MO-IL 7.5 Minute Topo Quad, 1976

Date: January 2014

Project No: EPS71204.0016

C:\GIS_Workspaces\Seagull\EPS71204\0016\Projects\mxd\Figure1_012814.mxd

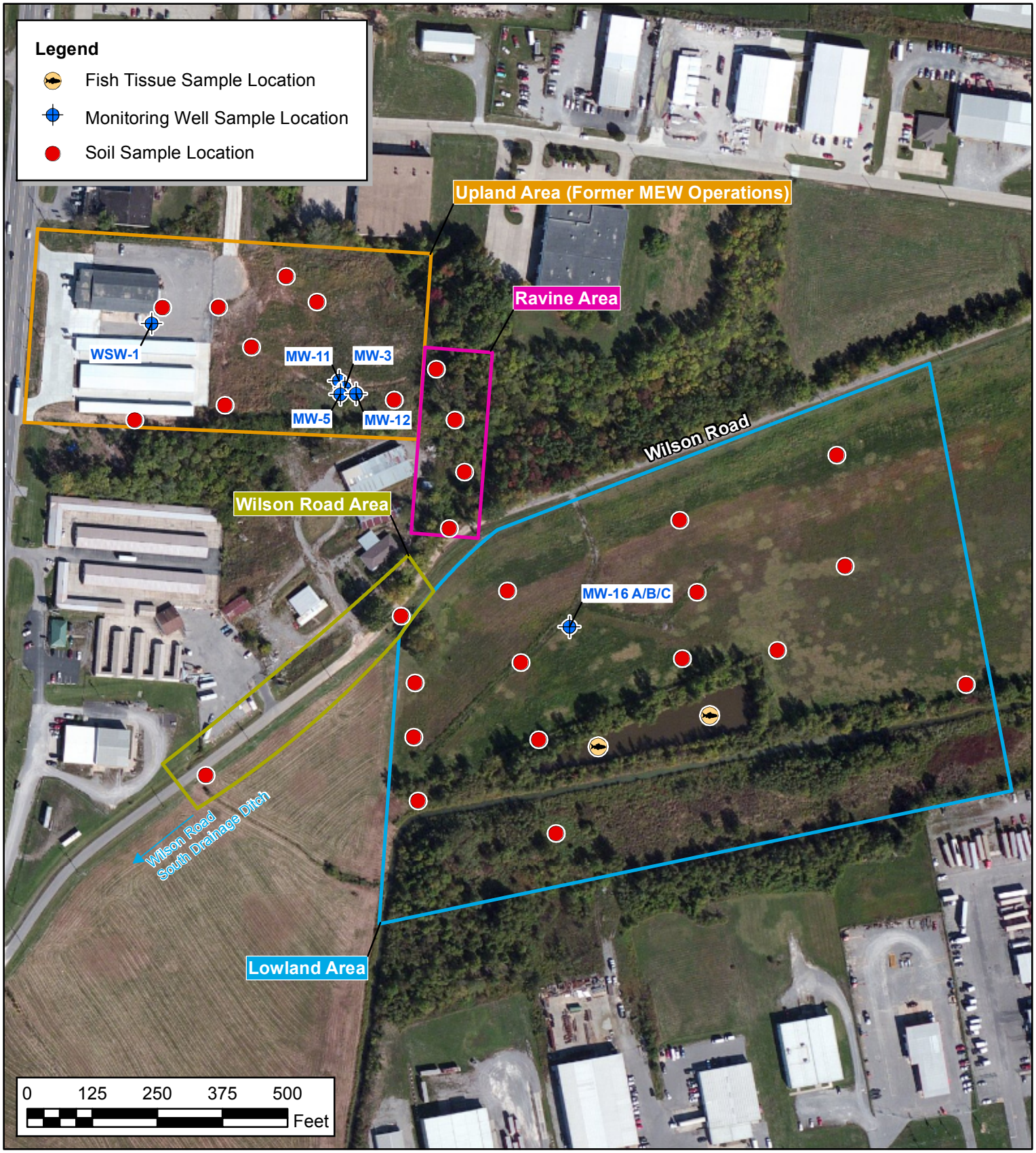

Figure 2
Sample Location Map
Missouri Electric Works OU2 Site
Cape Girardeau, Missouri

N
W
E
S

Seagull Environmental Technologies, Inc.

Source: ArcGIS Online World Imagery, 2011

Date: January 2014

Project No: EPS71204.0016

C:\GIS_Workspace\Seagull\EPS71204\0016\Projects\mxd\Figure2_012814.mxd